

What is claimed is:

1. A method for fabricating a shallow trench isolation, comprising the steps of:

5 sequentially depositing a silicon oxide layer, a silicon nitride layer and a moat pattern on a silicon substrate;

etching the silicon nitride layer and the silicon oxide layer using the moat pattern as a mask to thereby
10 partially expose the silicon substrate and then removing the moat pattern;

performing ion implanting process into the silicon substrate using the silicon nitride layer as a mask, adjusting a dose of an implanted ion and an implant energy,
15 to thereby form an isolation region;

anodizing the isolation region to form a porous silicon and to form an air gap in the porous silicon, wherein a porosity of the porous silicon is determined by the dose of the implanted ion;

20 oxidizing the porous silicon through an oxidation process; and

removing the silicon nitride layer.

2. The method of claim 1, wherein the etching step
25 includes the steps of etching the silicon nitride layer with a slope or inserting an additional sidewall nitride

layer process into the STI process to form a space smaller than the moat pattern.

3. The method of claim 1, wherein the ion implanting
5 process is iteratively performed using different ion
implant conditions to thereby form the isolation region
having a stepwise ion concentration.

4. The method of claim 1, wherein the ion implanting
10 process is performed with N-type material.

5. The method of claim 1, wherein the ion implanting
process is performed with P-type material.

15 6. The method of claim 1, wherein a porosity and a
thickness of the porous silicon is controlled by adjusting
a reaction time in anodic oxidation.

7. The method of claim 1, wherein a porosity and a
20 thickness of the porous silicon is controlled by adjusting
a current density in anodic oxidation.

8. The method of claim 1, wherein a porosity and a
thickness of the porous silicon is controlled by adjusting
25 hydrofluoric (HF) concentration in anodic oxidation.